

**AMENDMENTS TO THE CLAIMS**

1    1 (Currently Amended). An iterative equalizer for a data communication system for recovering  
2    received data transmitted over a data channel comprising:

3                 a first linear filter for filtering a block of received data according to first filter  
4                 parameters to generate first-filtered data;

5                 a combiner for modifying the first-filtered data with second-filtered data to  
6                 generate modified data;

7                 a decision device for generating modified tentative decisions on all data in the  
8                 block based on the modified data, the modified tentative decisions being modified with  
9                 respect to tentative decisions of a previous iteration, said modified tentative decisions  
10                 being used to subtract out an estimate of the intersymbol interference; and

11                 a second linear filter for causally and anticausally filtering said block of tentative  
12                 decisions from a previous pass according to second filter parameters to generate said  
13                 second-filtered data so as to produce an estimate of the intersymbol interference;

14                 wherein said received block of data is filtered more than once by multiple non-  
15                 simultaneous passes through the data, each pass comprising both a first filter and a  
16                 second filter and said first and second filter parameters are based on the received data  
17                 and the intersymbol interference is removed from said modified data in a nonlinear  
18                 manner.

1    2 (Original). The equalizer of claim 1 wherein the first and second filter parameters are modified  
2    at each iteration.

1    3 (Original). The equalizer of claim 1 wherein the equalizer is fractionally-spaced in that the  
2    received data is sampled at a rate higher than a symbol rate associated with the received data.

1    4 (Original). The equalizer of claim 1 wherein the received data comprises symbol data.

1    5 (Original). The equalizer of claim 1 wherein the first and second filter parameters are modified  
2    at each iteration according to channel parameters that are re-estimated at each iteration based on  
3    the received data.

1    6 (Original). The equalizer of claim 1 wherein the received data is encoded for error-correction  
2    coding, and wherein the decision device comprises an error-correction decoder and further  
3    comprising an encoder for error-correction encoding the tentative decisions from a previous  
4    iteration.

1    7 (Previously Presented). The equalizer of claim 1 wherein the first and second filters comprise  
2    filter types selected from the group of filter types consisting of: time-variant, time-invariant,  
3    infinite-impulse-response, and finite-impulse-response filters.

1    8 (Original). The equalizer of claim 1 wherein the received data comprises a plurality of  
2    received signals received over a plurality of said data channels, and wherein the equalizer further  
3    comprises a like plurality of said first filters corresponding to the plurality of channels.

1    9 (Original). The equalizer of claim 1 wherein the received data comprises combined data for a  
2    plurality of users, and wherein the equalizer further comprises a like plurality of said second  
3    filters corresponding to the plurality of users.

1 10 (Original). The equalizer of claim 1 wherein the first filter, combiner, decision device and  
2 second filter are distributed among a data channel transmitter and receiver.

1 11 (Currently Amended). An iterative equalizer for a data communication system for recovering  
2 received data transmitted over a data channel having channel parameters comprising:

3 a first linear filter for filtering a block of received data according to first filter  
4 parameters to generate first-filtered data;

5 a combiner for modifying the first-filtered data with second-filtered data to  
6 generate modified data;

7 a decision device for generating modified tentative decisions on all data in the  
8 block based on the modified data, the modified tentative decisions being modified with  
9 respect to tentative decisions of a previous iteration said modified tentative decisions  
10 being used to subtract out an estimate of the intersymbol interference; and

11 a second linear filter for causally and anticausally filtering said block of tentative  
12 decisions from a previous pass according to second filter parameters to generate said  
13 second-filtered data so as to produce an estimate of the intersymbol interference;

14 wherein said received block of data is filtered more than once by multiple non-  
15 simultaneous passes through the data, each pass comprising both a first filter and a  
16 second filter and said first and second filter parameters are based on an estimate of said  
17 channel parameters, and wherein the received data is encoded for error-correction coding,  
18 and wherein the decision device comprises an error-correction decoder and further  
19 comprising an encoder for error-correction encoding said tentative decisions from a

20 previous iteration so that intersymbol interference is removed from said modified data in  
21 a nonlinear manner.

1 12 (Original). The equalizer of claim 11 wherein said first and second filter parameters are  
2 modified at each iteration.

1 13 (Currently Amended). An iterative equalizer for a data communication system for recovering  
2 received data transmitted over a plurality of data channels comprising:

3 a first linear filter for filtering received a block of data according to first filter  
4 parameters to generate first-filtered data;

5 a combiner for modifying the first-filtered data with second-filtered data to  
6 generate modified data;

7 a decision device for generating modified tentative decisions on all data in the  
8 block based on the modified data, the modified tentative decisions being modified with  
9 respect to tentative decisions of a previous iteration said modified tentative decisions  
10 being used to subtract out an estimate of the intersymbol interference; and

11 a second linear filter for causally and anticausally filtering said block of tentative  
12 decisions from a previous pass according to second filter parameters to generate said  
13 second-filtered data so as to produce an estimate of the intersymbol interference;

14 wherein said received block of data is filtered more than once by multiple non-  
15 simultaneous passes through the data, each pass comprising both a first filter and a  
16 second filter and said first and second filter parameters are based on an estimate of said  
17 channel parameters, and wherein the received data comprises a plurality of received

18       signals received over the plurality of data channels, and wherein the equalizer further  
19       comprises a like plurality of said first filters corresponding to the plurality of channels so  
20       that intersymbol interference is removed from said modified data in a nonlinear manner.

1       14 (Original). The equalizer of claim 13 wherein said first and second filter parameters are  
2       modified at each iteration.

1       15 (Currently Amended). An iterative equalizer for a data communication system for recovering  
2       received data transmitted over a data channel comprising:

3                 a first linear filter for filtering a block of received data according to first filter  
4       parameters to generate first-filtered data;

5                 a combiner for modifying the first-filtered data with second-filtered data to  
6       generate modified data;

7                 a decision device for generating modified tentative decisions on all data in the  
8       block based on the modified data, the modified tentative decisions being modified with  
9       respect to tentative decisions of a previous iteration, said modified tentative decisions  
10      being used to subtract out an estimate of the intersymbol interference; and

11                 a second linear filter for causally and anticausally filtering said block of tentative  
12       decisions from a previous pass according to second filter parameters to generate said  
13       second-filtered data so as to produce an estimate of the intersymbol interference;

14                 wherein said received block of data is filtered more than once by multiple non-  
15       simultaneous passes through the data, each pass comprising both a first filter and a  
16       second filter and said first and second filter parameters are based on an estimate of said

17 channel parameters, and wherein the equalizer is fractionally spaced in that the received  
18 data is sampled at a rate higher than a symbol rate associated with the received data so  
19 that intersymbol interference is removed from said modified data in a nonlinear manner.

1 16 (Original). The equalizer of claim 15 wherein said first and second filter parameters are  
2 modified at each iteration.

1 17 (Currently Amended). A method for recovering received data transmitted over a data channel  
2 in a data communication system comprising iteratively:

3 first-filtering a block of received data according to first filter parameters to  
4 generate first-filtered data;

5 modifying the first-filtered data with second-filtered data to generate modified  
6 data;

7 generating modified tentative decisions on all data in the block based on the  
8 modified data, the modified tentative decisions being modified with respect to tentative  
9 decisions of a previous iteration, said modified tentative decisions being used to subtract  
10 out an estimate of the intersymbol interference; and

11 causally and anticausally filtering said block of tentative decisions from a  
12 previous pass according to second filter parameters to generate said second-filtered data  
13 so as to produce an estimate of the intersymbol interference;

14 wherein said received block of data is filtered more than once by multiple non-  
15 simultaneous passes through the data, each pass comprising both a first filter and a

16 second filter and said first and second filter parameters are based on the received data so  
17 that intersymbol interference is removed from said modified data in a nonlinear manner.

1 18 (Original). The method of claim 17 further comprising modifying the first and second filter  
2 parameters at each iteration.

1 19 (Original). The method of claim 17 wherein the received data is sampled at a rate higher than  
2 a sample rate associated with the received data.

1 20 (Original). The method of claim 17 wherein the received data comprises symbol data.

1 21 (Original). The method of claim 17 further comprising modifying the first and second filter  
2 parameters at each iteration according to channel parameters that are re-estimated at each  
3 iteration based on the received data.

1 22 (Original). The method of claim 17 wherein the received data is encoded for error-correction  
2 coding, and wherein generating modified tentative decisions based on the modified data  
3 comprises error-correction decoding the modified data and further comprising error-correction  
4 encoding the tentative decisions from a previous iteration.

1 23 (Previously Presented). The method of claim 17 wherein the first and second filters comprise  
2 filter types selected from the group of filter types consisting of: non-linear, time-variant, time-  
3 invariant, infinite-impulse-response, and finite-impulse-response filters.

1    24 (Original). The method of claim 17 wherein the received data comprises a plurality of  
2    received signals received over a plurality of said data channels, and further comprising first-  
3    filtering the received data at a plurality of first filters corresponding to the plurality of channels.

1    25 (Original). The method of claim 17 wherein the received data comprises combined data for a  
2    plurality of users, and further comprising second-filtering the tentative decisions from a previous  
3    iteration at a plurality of second filters corresponding to the plurality of users.

1    26 (Original). The method of claim 17 wherein the first filter, combiner, decision device and  
2    second filter are distributed among a data channel transmitter and receiver.

1    27 (Currently Amended). A method for recovering received data transmitted over a data channel  
2    having channel parameters, in a data communication system, comprising iteratively:

3                 first-filtering a block of received data according to first filter parameters to  
4                 generate first-filtered data;

5                 modifying the first-filtered a block of data with second-filtered data to generate  
6                 modified data;

7                 generating modified tentative decisions on all data in the block based on the  
8                 modified data, the modified tentative decisions being modified with respect to tentative  
9                 decisions of a previous iteration, said modified tentative decisions being used to subtract  
10                 out an estimate of the intersymbol interference; and

11                 causally and anticausally filtering said block of tentative decisions from a  
12                 previous pass according to second filter parameters to generate said second-filtered data  
13                 so as to produce an estimate of the intersymbol interference;

14           wherein said received block of data is filtered more than once by multiple non-  
15           simultaneous passes through the data, each pass comprising both a first filter and a  
16           second filter and said first and second filter parameters are based on an estimate of said  
17           channel parameters, and wherein the received data is encoded for error-correction coding,  
18           and wherein generating modified tentative decisions based on the modified data  
19           comprises error-correction decoding the modified data and further comprising error-  
20           correction encoding the tentative decisions from a previous iteration so that intersymbol  
21           interference is removed from said modified data in a nonlinear manner.

1       28 (Original). The method of claim 27 further comprising modifying the first and second filter  
2       parameters at each iteration.

1       29 (Currently Amended). A method for recovering received data transmitted over a plurality of  
2       data channels having channel parameters, in a data communication system, comprising  
3       iteratively:

4           first-filtering a block of received data according to first filter parameters to  
5           generate first-filtered data;  
6           modifying the first-filtered data with second-filtered data to generate modified  
7           data;  
8           generating modified tentative decisions on all data in the block based on the  
9           modified data, the modified tentative decisions being modified with respect to tentative  
10          decisions of a previous iteration, said modified tentative decisions being used to subtract  
11          out an estimate of the intersymbol interference; and

12 causally and anticausally filtering said block of tentative decisions from a  
13 previous pass according to second filter parameters to generate said second-filtered data  
14 so as to produce an estimate of the intersymbol interference;

15 wherein said received block of data is filtered more than once by multiple non-  
16 simultaneous passes through the data, each pass comprising both a first filter and a  
17 second filter and said first and second filter parameters are based on an estimate of said  
18 channel parameters, wherein the received data comprises a plurality of received signals  
19 received over the plurality of data channels, and further comprising first-filtering the  
20 received data at a plurality of first filters corresponding to the plurality of channels so that  
21 intersymbol interference is removed from said modified data in a nonlinear manner.

1 30 (Original). The method of claim 29 further comprising modifying the first and second filter  
2 parameters at each iteration.

1 31 (Currently Amended). A method for recovering received data transmitted over a data channel  
2 having channel parameters, in a data communication system, comprising iteratively:

3 first-filtering a block of received data according to first filter parameters to  
4 generate first-filtered data;

5 modifying the first-filtered data with second-filtered data to generate modified  
6 data;

7 generating modified tentative decisions on all data in the block based on the  
8 modified data, the modified tentative decisions being modified with respect to tentative

9 decisions of a previous iteration, said modified tentative decisions being used to subtract  
10 out an estimate of the intersymbol interference; and

11 causally and anticausally filtering said block of tentative decisions from a  
12 previous pass according to second filter parameters to generate said second-filtered data  
13 so as to produce an estimate of the intersymbol interference;

14 wherein said received block of data is filtered more than once by multiple non-  
15 simultaneous passes through the data, each pass comprising both a first filter and a  
16 second filter and said first and second filter parameters are based on an estimate of said  
17 channel parameters, and wherein the received data is sampled at a rate higher than a  
18 symbol rate associated with the received data so that intersymbol interference is removed  
19 from said modified data in a nonlinear manner.

1 32 (Original). The method of claim 31 further comprising modifying the first and second filter  
2 parameters at each iteration.